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|--|-------------|----------------------|----------------------------|------------------|
| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.        | CONFIRMATION NO. |
| 10/553,849   | 10/20/2005  | Hiroyasu Saka        | TAN-355                    | 6309             |
| 35777 7590 04/03/2007<br>SHERMAN & ASSOCIATES<br>415 NORTH ALFRED STREET<br>ALEXANDRIA, VA 22314 |             |                      | EXAMINER<br>PARVINI, PEGAH |                  |
|  |             |                      | ART UNIT<br>1755           | PAPER NUMBER     |
| SHORTENED STATUTORY PERIOD OF RESPONSE   |             |                      | MAIL DATE                  | DELIVERY MODE    |
| 3 MONTHS   |             |                      | 04/03/2007                 | PAPER            |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/553,849

Applicant(s)

SAKA ET AL.

Examiner

Pegah Parvini

Art Unit

1755

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 October 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4 and 5 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 1 provides for the use of abrasives in surface toughening of a ceramics sintered material cutting tool, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

3. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is not clear whether claim 1 claims hardness of 50 and above or 50 and less since the claim recites "+50" followed by "or less".

4. Claims 1 and 3 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

A link is missing between claims 1 and 3 in surface toughening of a ceramics sintered material cutting tool. Claim 3 depends upon claim 1.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-2, and 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent Application Publication No. 2003/0027707 to Yamamoto et al. in view of US Patent Application Publication No. 2004/0067839 to Nawa et al.

Yamamoto et al. teach a sintered alumina ceramic and its production by controlling the particle size of the alumina particles in which the disclosed sintered alumina ceramic has both high strength and high hardness and is used as a cutting tool ([0006], [0008], [0018]). The alumina particles have an average particle size of 4.0  $\mu\text{m}$  or smaller ([0009], [0018]). In addition, the disclosed sintered alumina ceramic yields a Vickers hardness of 1800 or higher, preferably 1900 or higher and more preferably 1950 to higher at room temperature ([0027]). It, also, exhibit a Vickers hardness of 800 or higher, preferably 820 or higher, and more preferably 850 or higher at 1000°C ([0027]).

Yamamoto et al. is silent as to a linear dislocation in the ceramics sintered material.

Nawa et al. disclose a ceramic composite material made of fine  $\text{Al}_2\text{O}_3$  grains and  $\text{ZrO}_2$  grains dispersed in each other which is sintered to give rise to the disclosed composite ceramic material having excellent wear resistance and hardness as well as mechanical strength ([0009], [0034]). Nawa et al., further, disclose that the  $\text{Al}_2\text{O}_3$  particle size is in the range of 0.1 to 0.5  $\mu\text{m}$  ([0012]). Additionally, Nawa et al. disclose that the residual stress generated around each of fine grains dispersed within the crystal grain during cooling procedure after sintering, cause dislocation within the respective crystal grains; the dislocations piled up each other and eventually formed sub-grain boundaries within the crystal grains ([0034]).

It would have been obvious to a person of ordinary skill in the art to modify Yamamoto et al. to include the dislocation occurring in the crystal grains of the ceramic material in the cooling process after sintering as that taught by Nawa et al. motivated by the fact that both references disclose a sintered alumina base ceramic material which has  $\text{Al}_2\text{O}_3$  grains; in addition, the ceramic material disclosed in both demonstrate a high mechanical strength, toughness, excellent wear resistance and toughness.

It is noted that even though the references do not teach a dislocation in the ceramic material in the range of  $1 \times 10^4$  to  $1 \times 10^{13} \text{ cm}^{-2}$ , they disclose sintered ceramic material used as cutting tools having excellent toughness and hardness with overlapping ranges for the particles size and hardness as claimed in the instant application. The references disclose a material with most of the properties claimed in the instant application, which has similar utility; therefore, the claimed dislocation value

Art Unit: 1755

is assumed to be inherent to the sintered ceramic material used as a cutting tool. See MPEP § 2112.01.

### ***Allowable Subject Matter***

7. Claim 3 is objected to as being rejected on 35 U.S.C. § 112 and being dependent upon a rejected base claim, but would be allowable if the 35 U.S.C. § 112 rejection is overcome and if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art fails to disclose a surface toughening of ceramics sintered material cutting tool in which a plastic working is carried out by shot blasting with the specific pressure range of 0.1 to 0.5 MPa, speed of 20 m/sec to 250 m/sec, shot blasting amount of 50 g/m to 800 g/m and shot blasting time of 0.1 sec/cm<sup>2</sup> or more to 60 sec/cm<sup>2</sup> or less.

### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US Patent No. 4,366,254 to Rich et al.

US Patent No. 6,133,182 to Sasaki et al.

US Patent No. 5,916,833 to Suzuki et al.

Art Unit: 1755

US Patent No. 6,659,647 to Sugiyama et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pegah Parvini whose telephone number is 571-272-2639. The examiner can normally be reached on Monday to Friday 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on 571-272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PP

  
J.A. LORENGO  
SUPERVISORY PATENT EXAMINER